

**WELL INSTALLATION AND QUARTERLY
GROUNDWATER MONITORING REPORT
FRIESMAN RANCH PROPERTY
LIVERMORE, CALIFORNIA**

Feb 1999

February 17, 1999

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A Report Prepared for:

Children's Hospital Medical Foundation
5225 Dover Street
Oakland, California 94609

**WELL INSTALLATION AND QUARTERLY
GROUNDWATER MONITORING REPORT
FRIESMAN RANCH PROPERTY
LIVERMORE, CALIFORNIA**

Kleinfelder Job No. 10-3006-13/013

Prepared by:

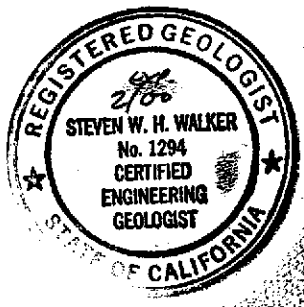


Neal E. Siler, R.E.A.
Project Manager

Approved by



Steven W. H. Walker, R.G., C.E.G.
Senior Geologist



KLEINFELDER, INC.
7133 Koll Center Parkway
Suite 100
Pleasanton, California 94566
(925)484-1700

February 17, 1999

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1. INTRODUCTION

This report describes the results of the Fourth Quarter 1998 Groundwater Monitoring Event performed at the Friesman Ranch Property, Livermore, California (Plate 1). The Fourth Quarter 1998 Groundwater Monitoring Event is the first quarterly monitoring event performed at the site and the first performed since September 1997. Prior to the monitoring event, two additional groundwater monitoring wells were installed to address potential data gaps.

The work performed was based on our report entitled *Remedial Investigation, RBCA Tier 2 Evaluation and Remedial Action Plan, Friesman Ranch Property, Livermore, California* dated October 17, 1997 (our Report) and the Alameda County Health Care Services Agency, Environmental Health Services Division's (ACHCSA's) letter regarding *Additional Investigations at 1600 Friesman Road, Livermore, CA* dated July 29, 1998. Preparation of this report is a key task of our Workplan dated November 18, 1998 [Kleinfelder, Inc. (Kleinfelder), 1998]

1.1 PURPOSE, OBJECTIVES AND SCOPE OF WORK

The purpose of the additional investigations was to close data gaps identified in our Report. The objectives of the additional investigations were to:

- Provide a monitoring point in the inferred downgradient direction of groundwater flow (northwest);
- Provide a monitoring point in the suspected source area;
- Initiate and implement a regularly scheduled groundwater monitoring program for a period of one year to track spatial and temporal variations in groundwater conditions; and
- Re-evaluate and modify the groundwater monitoring program as appropriate after the initial year of regularly scheduled monitoring.

In order to meet these objectives, the following scope of work was implemented:

- Installation of two groundwater monitoring wells;
- Initiation and implementation of a regularly scheduled groundwater monitoring program; and
- Preparation of this quarterly groundwater monitoring report.

2. FIELD ACTIVITIES

2.1 INTRODUCTION

This section summarizes the field activities performed for the well installation and quarterly groundwater monitoring programs. All field activities were performed from December 23, 1998 through January 12, 1999. Plate 2 shows the locations of the existing and recently installed groundwater monitoring wells.

2.2 GROUNDWATER MONITORING WELL INSTALLATIONS

On December 23, 1998, Kleinfelder installed two additional monitoring wells at the site (Plate 2). These wells were used to close data gaps and provide monitoring points for the measurement of groundwater levels and free-product thickness, and for sampling water quality. Well KMW-7 was installed between the metal shed that reportedly contained the former heating oil aboveground storage tank (AST), the suspected source of environmental impacts, and the dairy building to provide a monitoring point near the suspected source area. Well KMW-8 was installed northwest of Well KMW-6 and the developed portion of the property to provide a monitoring point in the inferred downgradient direction of groundwater flow.

2.2.1 Field Preparation Activities

Prior to the performance of any intrusive field procedures, the following tasks were performed:

- Notification of Underground Services Alert (USA); and
- Procurement of a soil boring/well installation permit (No. 98208) from the Alameda County Flood Control and Water Conservation District - Zone 7 (ACFCWCD) to perform the additional investigation (Appendix A).

2.2.2 Soil Boring Procedures

The two testholes for the monitoring wells were advanced using a truck-mounted drilling rig equipped with 10-inch outside diameter (OD) hollow stem augers (HSAs). Soil samples were not collected from the testholes. Given the close proximity of these testholes to previous borings the soil boring logs for these additional test borings were created from current field observations and previous soil boring logs. The soil boring logs (Appendix B) include a description of the geologic character of the materials encountered, classification of materials by the Unified Soil Classification System (USCS), depth at which changes were observed, thickness of units, and depth at which groundwater was encountered.

2.2.3 Monitoring Well Construction

The testholes were converted to Monitoring Wells KMW-7 and KMW-8. Well completion diagrams are included in Appendix B.

The blank casing and screen for each monitoring well was constructed of 4-inch OD, Schedule 40 polyvinyl chloride (PVC) with 15 feet of well screen (slot size 0.020 inch) located from approximately 10 to 25 feet below ground surface (bgs). Lonestar™ No. 2/12 sand was placed in the annulus next to the screen to a depth of 9 feet bgs and capped with approximately 2 feet of hydrated bentonite pellets. The remaining 7 feet of annular space was backfilled with a cement/bentonite grout (one 94-pound sack of Portland cement to 5 gallons of water) to complete the sanitary seal. The PVC casing was completed with a vented locking cap and covered by a flush-mounted steel protective curb box that was grouted into place.

2.2.4 Well Development

Kleinfelder developed the two new wells on December 23, 1998. The goals of development were to remove fine sediment from the well casing and screen, to stabilize the filter pack to maximize flow between the well and the shallow water-bearing zone, and to repair formation damage created from drilling.

Prior to development, the depth to water was measured in each new well using a calibrated electronic water-level indicator. Water level measurements were recorded to the nearest 0.01 foot on Well Development and Sampling Logs (Appendix C).

Well development was performed using a surge block and a 3.5-inch OD bailer. The surge block was forcibly moved up and down to cause formation water to surge in and out of the well screen. The well was then purged using a bailer to remove the suspended sediment. Aquifer parameters (temperature, pH, and electrical conductivity) were measured for each well casing volume purged. No detergents, soaps, acids, bleaches, or other additives were used to develop the wells.

2.3 GROUNDWATER MONITORING ACTIVITIES

After the new wells were installed, the first quarterly groundwater monitoring event was initiated five days later on December 28, 1998. The two new wells (KMW-7 and -8) and previously installed wells (KMW-1 through -6) were monitored. The goal of sampling was to collect water samples which accurately represent conditions in the vicinity of each well. To this end, the wells were purged until stabilization of aquifer parameters was achieved.

Prior to sampling, field instrumentation was calibrated and/or checked before opening the monitoring wells. All instruments were successfully calibrated or checked (Appendix C).

2.3.1 Water Level Measurement

All wells were opened and ventilated for a minimum of 0.5 hour. Prior to purging, the depth to water was measured in each well to the nearest 0.01 foot using a clean, calibrated electronic water-level indicator. Water-level data were used to calculate the required purge volumes for sampling. Measurements were recorded on Water-Level Measurement Records and Well Development and Sampling Logs (Appendix C).

2.3.2 Free-Product Thickness Measurement

On December 28, 1998, prior to purging each well, the free-product thickness was measured using a bailer and other conditions indicative of product (i.e., a sheen on the surface, strong odors, etc.) were recorded. In addition, on January 12, 1999, the water level and free-product thickness in each well was measured using a clean oil/water interface probe (Appendix C).

2.3.3 Groundwater Sample Collection

Upon completion of the water-level measurements, Kleinfelder purged the monitoring wells by bailing them with disposable bailers. During purging, aquifer parameters (pH, temperature, and electrical conductivity) were measured to evaluate whether the water in each well has been stabilized prior to sampling (Appendix C). The wells were purged until a minimum of three casing volumes of water were removed and water levels were allowed to recover to near static levels before sampling.

Water from each well was collected using a new disposable PVC bailer. Groundwater monitoring well samples collected for chemical analysis were placed in appropriate containers, labeled and placed in Ziploc™ plastic bags. The samples were then placed in an ice chest packed with loose water-based ice to 4 +/- 2 degrees Celsius for delivery to the laboratory.

2.3.4 Analytical Laboratory Parameters

Groundwater monitoring well samples were analyzed for the following parameters:

- Total petroleum hydrocarbons as gasoline (TPH-g) using Modified United States Environmental Protection Agency (EPA) Method 8015;
- Total petroleum hydrocarbons as diesel (TPH-d) using Modified EPA Method 8015;
- Benzene, toluene, ethylbenzene and total xylenes (BTEX) using EPA Method 8020;
- Methyl tertiary-butyl ether (MTBE) using EPA Method 8020;
- Polynuclear aromatic hydrocarbons (PAHs) using EPA Method 8270; and
- Total lead using EPA Method 6010/7000.

Any detections of MTBE were to be confirmed using EPA Method 8260.

2.3.5 Quality Assurance/Quality Control Sample Collection

Normal quality assurance/quality control (QA/QC) sampling activities includes the laboratory preparation and analysis of a trip blank that accompanies the ice chest to and from the laboratory. In addition, a blind duplicate and an equipment rinsate blank are collected and analyzed. All of these samples are analyzed for TPH-g and BTEX.

For this event, the following QA/QC samples were prepared or collected:

- A trip blank; and
- A blind duplicate.

Because only disposable equipment was used to purge the wells and collect the samples, no equipment blank was collected.

3. SUMMARY OF RESULTS

3.1 INTRODUCTION

Water-level and free-product thickness measurements were recorded on December 28, 1998, and January 12, 1999. Groundwater samples were collected from each of the eight monitoring wells on December 28, 1998, and submitted for analysis. The monitoring well samples were analyzed at McCampbell Analytical, Inc., a laboratory certified by the California Environmental Protection Agency (Cal/EPA), Department of Health Services (DHS) Environmental Laboratory Accreditation Program (ELAP) for the specific analysis performed.

3.2 WATER LEVELS

As part of the groundwater monitoring event, water levels were measured in the eight monitoring wells on December 28, 1998. Depths to water ranged from 12.39 to 14.17 feet bgs (Table 1). These water-level measurements were used to calculate the groundwater elevation map depicted on Plate 3. On this date, groundwater flow was to the northwest with a hydraulic gradient of 0.009 feet per foot (ft/ft). These results are consistent with the previous groundwater monitoring event in September 1997 (Kleinfelder, 1997).

Water levels measured on January 12, 1999, ranged from 12.97 to 15.32 feet bgs (Table 2). Although the overall hydraulic gradient was still to the northwest, there was a component of flow to the south (towards well KMW-3), in the south central portion of the property. Future monitoring events will be used to evaluate the significance of this inferred southerly component of flow.

3.3 FREE-PRODUCT THICKNESS

No sheen was observed on any of the samples; however wells KMW-6 and KMW-7 displayed a strong hydrocarbon odor. No measurable free product was detected using either a bailer (December 28, 1998) or the oil/water interface probe (January 12, 1999).

3.4 GROUNDWATER MONITORING WELL SAMPLES

A total of eight wells (KMW-1 through KMW-8) were sampled and analyzed for TPH-g, TPH-d, BTEX, MTBE, PAHs and total lead. These results are summarized in Table 3 and are depicted on Plate 4. Certified analytical laboratory reports are included in Appendix D.

3.4.1 Total Petroleum Hydrocarbons as Gasoline

TPH-g was detected at concentrations of 3,200 micrograms per liter ($\mu\text{g/L}$) in KMW-6 and 9,100 $\mu\text{g/L}$ in KMW 7, but was not detected in any of the other wells sampled.

3.4.2 Total Petroleum Hydrocarbons as Diesel

TPH-d was detected at concentrations of 1,800 µg/L in KMW-6 and 1,000 µg/L in KMW-7. It was not detected in any of the other wells sampled.

3.4.3 Aromatic Hydrocarbons

Aromatic hydrocarbons were detected in monitoring wells KMW-6 and KMW-7, but were not in any of the other wells sampled. Benzene was detected in excess of its drinking water maximum contaminant level (MCL), 1 µg/L, at concentrations of 86 µg/L in KMW-6 and 23 µg/L in KMW-7. Toluene was detected below its MCL (150 µg/L) at concentrations of 3.6 µg/L in KMW-6 and 17 µg/L in KMW-7. Ethylbenzene was detected below its MCL (700 µg/L) at concentrations of 140 µg/L in KMW-6 and 190 µg/L in KMW-7. Total xylenes was detected below the MCL (1,750 µg/L) at concentrations of 90 µg/L in KMW-6 and 700 µg/L in KMW-7.

3.4.4 Methyl Tertiary Butyl Ether

MTBE was not detected in any of the wells. The reporting limit was raised for KMW-6 to 50 µg/L and for KMW-7 to 70 µg/L due to interference from TPH-g concentrations.

3.4.5 Polynuclear Aromatic Hydrocarbons

PAHs were detected in two of the eight wells sampled. Naphthalene was the only PAH detected at concentrations of 130 µg/L in KMW-6 and 110 µg/L in KMW-7.

3.4.6 Total Lead

Total lead was detected in wells KMW-1, KMW-4, KMW-5, KMW-6, KMW-7, and KMW-8 and ranged in concentration from 5.9 µg/L to 38 µg/L. KMW-6 and KMW-7 were the only two wells containing lead at concentrations at or above its MCL (15 µg/L) at concentrations of 15 µg/L and 38 µg/L, respectively.

3.5 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

The QA/QC samples collected and analyzed for this groundwater monitoring event included a trip blank and a blind duplicate sample. The results for these QA/QC samples are summarized on Table 4 and certified analytical laboratory reports are contained in Appendix D.

3.5.1 Trip Blank

One trip blank was prepared and analyzed for the December 1998 groundwater monitoring event. The trip blank contained no detectable concentrations of TPH-g, TPH-d, or BTEX.

3.5.2 Blind Duplicate Sample

One blind duplicate sample (KMW-11) was collected from monitoring well KMW-1 on December 28, 1998. This duplicate sample was analyzed for TPH-g, TPH-d, BTEX, MTBE, PAHs and total lead.

The Relative Percent Difference (RPD) for total lead, the only analyte detected, was 27.7 percent (Table 3). The RPDs for TPH-g, TPH-d, BTEX, MTBE and PAHs were not calculable because none of these analytes were detected.

4. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The summary and conclusions presented in this section are based on research implemented, information collected, and interpretations developed during this and previous investigations performed at the property. The information evaluated in this report was collected by Kleinfelder during December 1998 and January 1999. The summary and conclusions that follow are presented in the categories of field activities, groundwater levels and free-product thickness, and groundwater chemistry.

4.1 FIELD ACTIVITIES

- Field activities performed consisted of installation of two monitoring wells and implementation of the first quarterly groundwater monitoring event;
- Two groundwater wells were installed on the central portion of the property to act as monitoring points to assess temporal and spatial variations in groundwater depth, flow, free-product thickness and chemistry. The purpose of these wells were to provide a monitoring point in the inferred downgradient direction (northwest) of groundwater flow and to provide a monitoring point in the suspected source area;
- One groundwater monitoring event was performed to initiate regularly scheduled, quarterly groundwater monitoring at the site. Water level and free-product thickness measurements and the collection of water quality samples were conducted. The samples collected were analyzed for TPH-g, TPH-d, BTEX, MTBE, PAHs, and total lead;
- Prior to the initiation of field activities, and between sampling locations, all equipment was decontaminated.
- Soil cuttings, decontamination rinsate fluids, well development and purge water were containerized and stored on-site in DOT-approved 55-gallon drums;
- Following completion of field activities the work area was left in a presentable and workable condition, as nearly as practicable to original conditions.

4.2 GROUNDWATER LEVELS AND FREE-PRODUCT THICKNESS

- Groundwater levels and free-product thickness measurements were performed on December 28, 1998, and January 12, 1999;
- Groundwater levels measurements ranged from 12.39 to 14.17 feet bgs on December 28, 1998. Groundwater level measurements ranged from 12.97 to 15.32 feet bgs on January 12, 1999;
- On December 28, 1998, groundwater flow was to the northwest with a hydraulic gradient of 0.009 ft/ft. These results are consistent with the previous groundwater monitoring event - September 1997. On January 12, 1999, groundwater flow was also to the northwest, but a component of flow was to the south (toward KMW-3) in the south

central portion of the site. Future monitoring events will help evaluate the significance of the groundwater flow inferred from the January 1999 data;

- No free-product was measured in any of the groundwater monitoring wells in December 1998 or January 1999. No sheen was observed on any of the water purged from the wells; however, wells KMW-6 and KMW-7 displayed a strong hydrocarbon odor.

4.3 WIPE, SOIL AND GROUNDWATER CHEMISTRY

- Only two groundwater monitoring well samples (KMW-6 and KMW-7) contained detectable concentrations of petroleum hydrocarbon compounds. None of the other groundwater samples contained detectable concentrations of petroleum hydrocarbon compounds;
- TPH-g was detected at 3,200 µg/L in KMW-6 and 9,100 µg/L in KMW-7. TPH-d was detected at 1,800 µg/L in KMW-6 and 1,000 µg/L in KMW-7. Benzene was detected in excess of its MCL at 86 µg/L in KMW-6 and 23 µg/L in KMW-7. Toluene was detected below its MCL (150 µg/L) at 3.6 µg/L in KMW-6 and 17 µg/L in KMW-7. Ethylbenzene was detected below its MCL (700 µg/L) at 140 µg/L in KMW-6 and 190 µg/L in KMW-7. Total xylenes was detected below the MCL (1,750 µg/L) at 90 µg/L in KMW-6 and 700 µg/L in KMW-7. Naphthalene was the only PAH detected at 130 µg/L in KMW-6 and 110 µg/L in KMW-7. MTBE was not detected in any of the groundwater monitoring well samples;
- Total lead was detected in wells KMW-1, KMW-4, KMW-5, KMW-6, KMW-7, and KMW-8 and ranged in concentration from 5.9 µg/L to 38 µg/L. KMW-6 and KMW-7 were the only two wells containing lead at concentrations at or above its MCL (15 µg/L).

4.4 RECOMMENDATIONS

Kleinfelder makes the following recommendations concerning further investigations and remedial actions at the property:

- The regularly scheduled groundwater monitoring program initiated with the December 1998 event should be continued, with the next event being implemented in March 1999; ✓
- Water levels and free-product thickness should be measured in and groundwater quality samples should be collected from the eight monitoring wells; ✓
- Groundwater quality samples collected from the eight monitoring wells should be analyzed for TPH-g, TPH-d, BTEX and MTBE. Only those samples collected from KMW-6 and KMW-7 should be analyzed for PAHs and lead. However, instead of total lead as quantified during the December 1998 event, dissolved lead (lab filtered with a 0.45-micron filter) will be quantified during the March 1999 event. The filtering will remove from the water the entrained sediment that may affect the results.

also do silica gel cleanup prior to 2015 analysis

5. LIMITATIONS

The scope of services described here is not intended to be inclusive, to identify all potential concerns, or to eliminate the possibility of environmental problems. Within current technology, no level of assessment can show conclusively that a property or its structures are completely free of contaminated and/or hazardous substances. Therefore, Kleinfelder cannot offer a certification that the recommendations made in this report will clear the property of environmental liability.

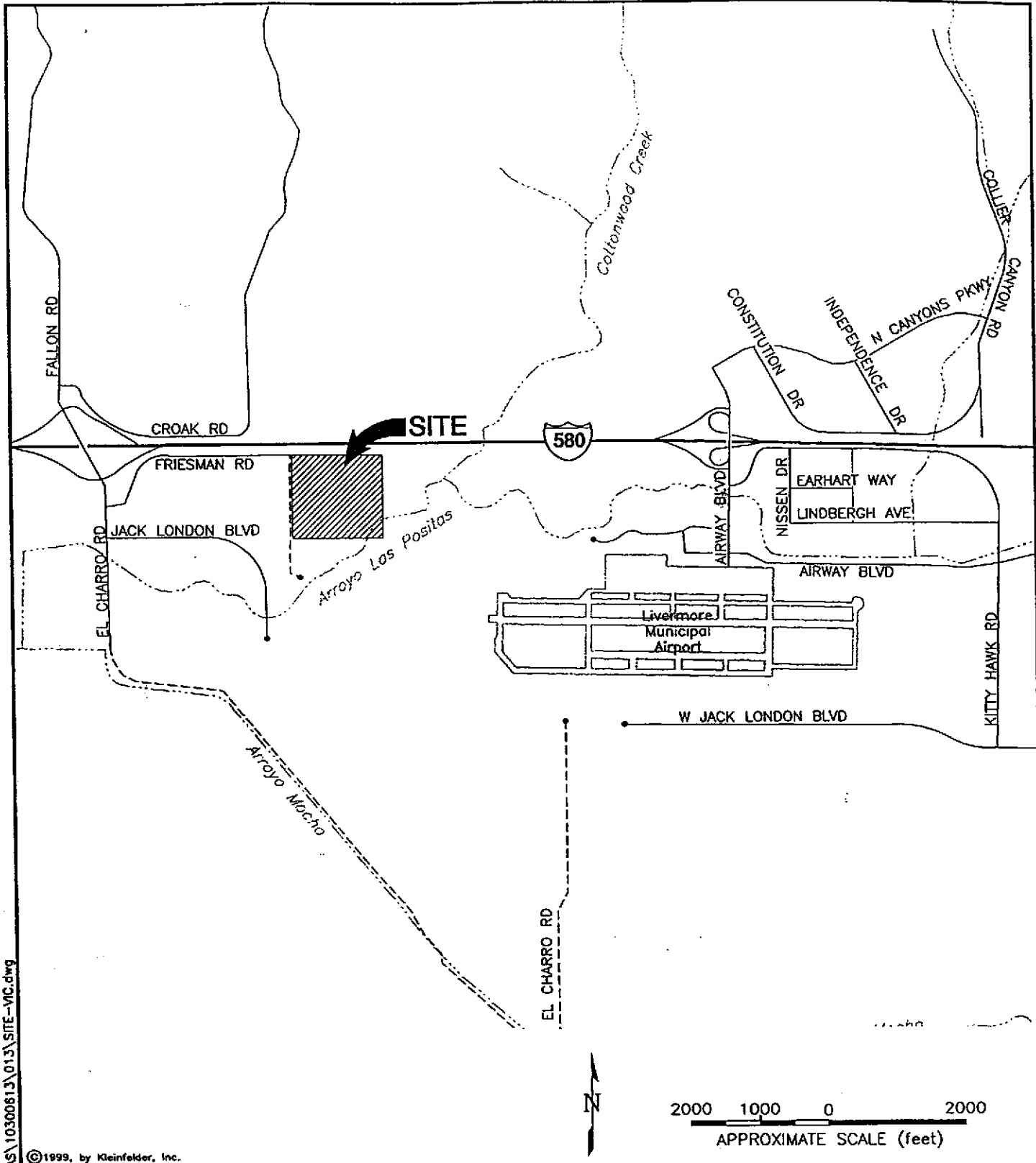
During the course of the performance of Kleinfelder's services, contaminated and/or hazardous materials were discovered. Our client or the property owner are solely responsible for notifying all governmental agencies, and the public at large, of the existence, release, treatment or disposal of any contaminated and/or hazardous materials observed at the project site, either before or during performance of Kleinfelder's services. Kleinfelder will assume no responsibility or liability whatsoever for any claim, loss of property value, damage, or injury which results from pre-existing hazardous materials being encountered or present on the project site, or from the discovery of such hazardous materials.

Kleinfelder performed the investigative activities and evaluations in accordance with generally accepted standards of care that existed in Northern California at the time the work was performed. No warranty, expressed or implied, is made.

6. REFERENCES


Kleinfelder, Inc., 1997 Remedial Investigation RBCA Tier 2 Evaluation and Remedial Action Plan, Friesman Ranch Property, Livermore, California. October 17.

Kleinfelder, Inc., 1998, Request for Authorization for Additional Services, Modified Remedial Action Implementation, Friesman Ranch Property, Livermore, California. August 24.



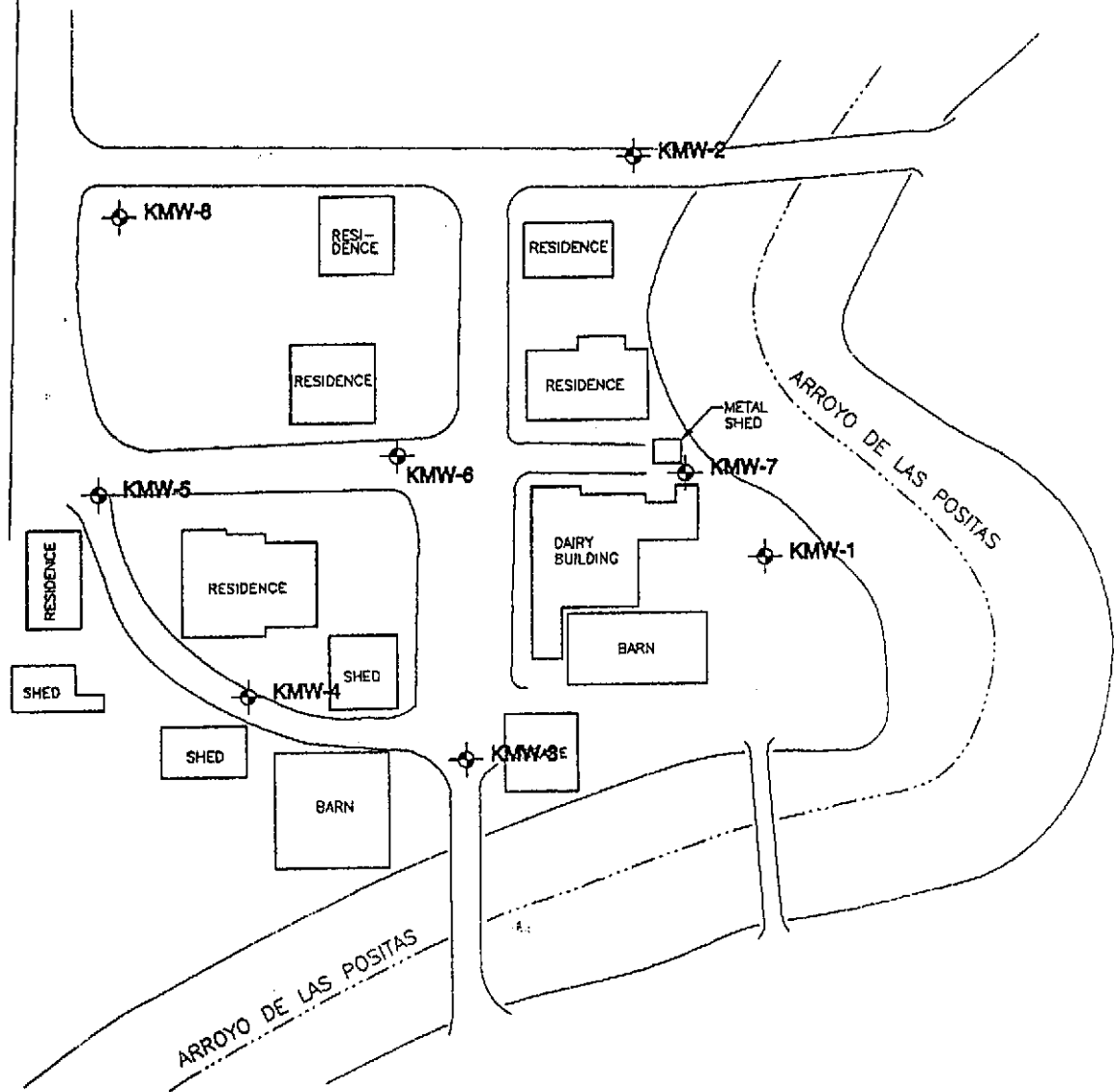
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 KLEINFELDER	SITE VICINITY MAP	PLATE 1
	DRAFTED BY: L. Sue DATE: 1/22/99 CHECKED BY: N. Siler DATE: 1/22/99	FRIESMAN RANCH PROPERTY 1600 FRIESMAN ROAD LIVERMORE, ALAMEDA COUNTY, CALIFORNIA PROJECT NO. 10-300613-013

LEGEND


 GROUNDWATER MONITORING WELL



NOTES:

1. Locations are approximate.



GROUNDWATER MONITORING WELL LOCATIONS

PLATE

FRIESMAN RANCH PROPERTY
1600 FRIESMAN ROAD
LIVERMORE, ALAMEDA COUNTY, CALIFORNIA

2

DRAFTED BY: L. Sue


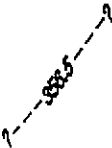

DATE: 1-22-99

CHECKED BY: N. Siler

DATE: 1-22-99

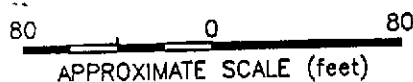
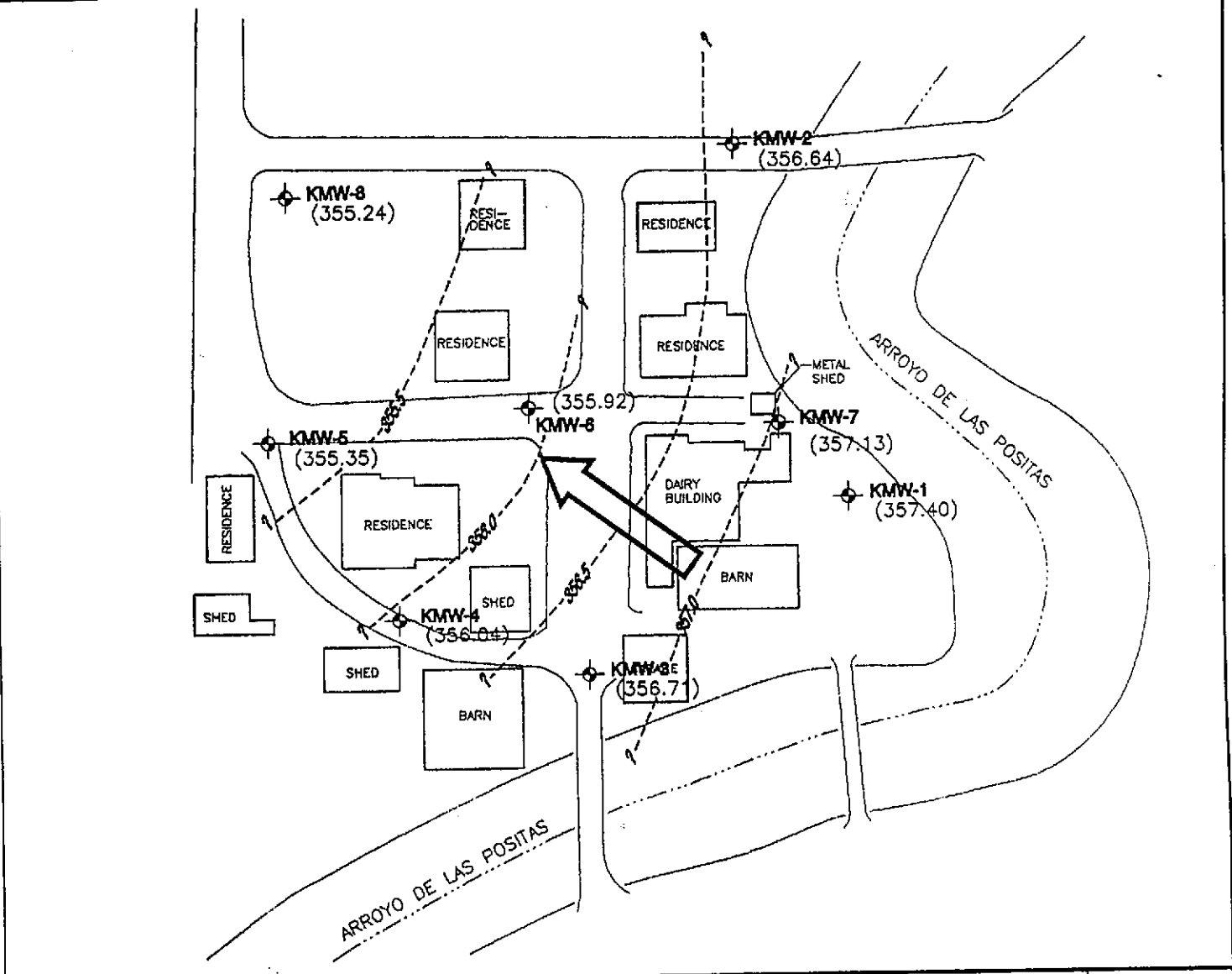
PROJECT NO. 10-300613-013

LEGEND

-  GROUNDWATER MONITORING WELL
- (356.04) GROUNDWATER ELEVATION, feet above mean sea level
-  GROUNDWATER ELEVATION CONTOUR, queried where approximate
-  GROUNDWATER FLOW DIRECTION

NOTES:

- 1. Locations are approximate.



**GROUNDWATER ELEVATIONS:
DECEMBER 28, 1998**

PLATE

3


FRIESMAN RANCH PROPERTY
1600 FRIESMAN ROAD
LIVERMORE, ALAMEDA COUNTY, CALIFORNIA

DRAFTED BY: L. Sue DATE: 1-22-99

CHECKED BY: N. Siler DATE: 1-22-99

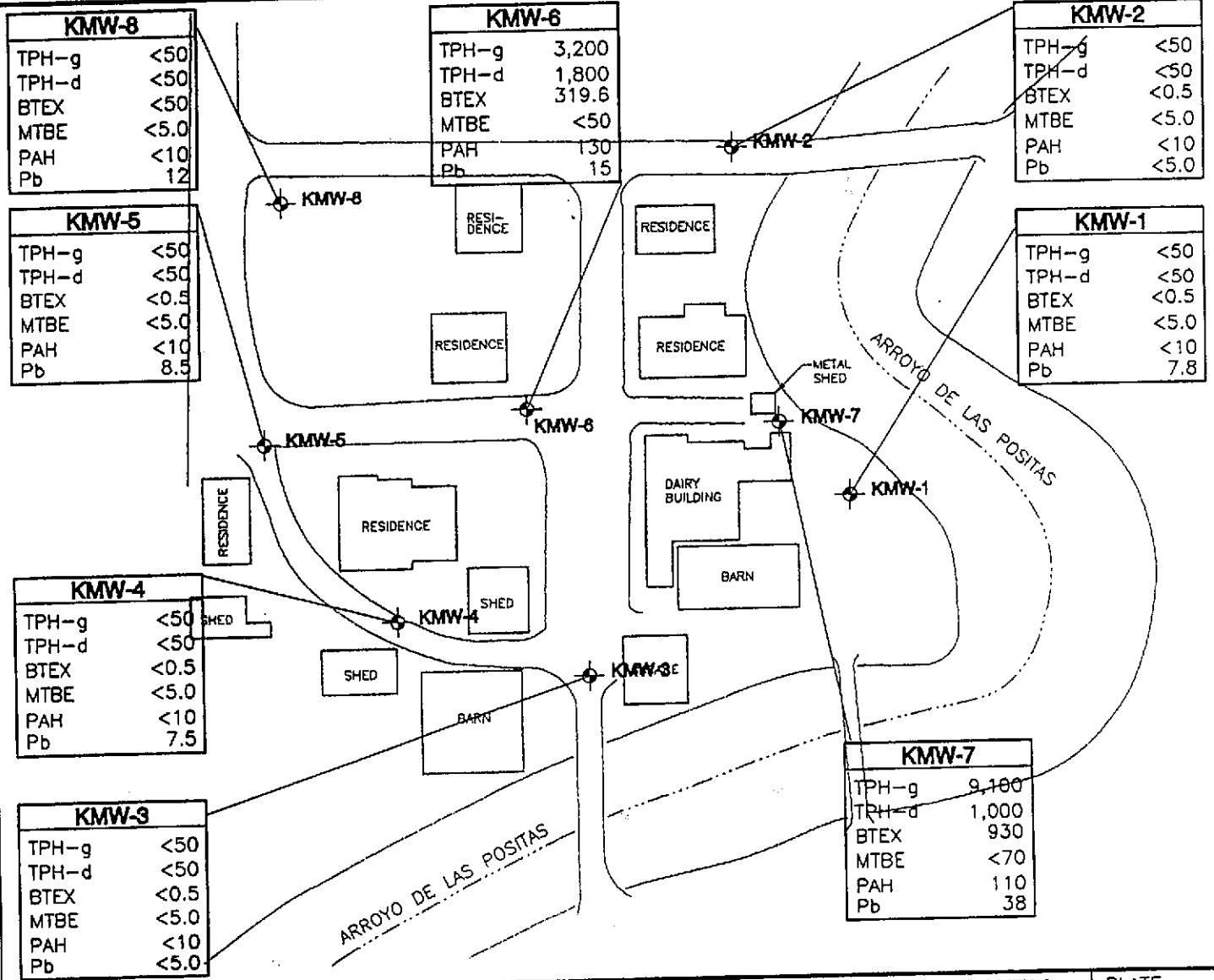
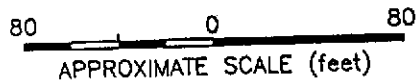
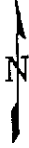
PROJECT NO. 10-300613-013

LEGEND

-  GROUNDWATER MONITORING WELL
- TPH TOTAL PETROLEUM HYDROCARBONS
- TPH-g TPH AS GASOLINE
- TPH-d TPH AS DIESEL
- BTEX BENZENE, TOLUENE, ETHYLBENZENE AND TOTAL XYLENES
- MTBE METHYL TERTIARY BUTYL ETHER
- PAH POLYNUCLEAR AROMATIC HYDROCARBON COMPOUNDS
- Pb TOTAL LEAD
- <50 NOT DETECTED above laboratory reporting limit

NOTES:

1. Locations are approximate.
2. All concentrations are reported in micrograms per liter ($\mu\text{g/L}$), approximately equivalent to parts per billion (ppb).



**GROUNDWATER MONITORING WELL
SAMPLE ANALYTICAL RESULTS:
DECEMBER 1998**

FRIESMAN RANCH PROPERTY
1600 FRIESMAN ROAD
LIVERMORE, ALAMEDA COUNTY, CALIFORNIA

DRAFTED BY: L. Sue DATE: 1-22-99
CHECKED BY: N. Siler DATE: 1-22-99

PROJECT NO. 10-300613-013

PLATE

4

TABLE 1
GROUNDWATER ELEVATION DATA
FRIESMAN RANCH PROPERTY
LIVERMORE, ALAMEDA COUNTY, CALIFORNIA
DECEMBER 1998

PERSONNEL: K. POWERS, M. MAHONEY

DATE: DECEMBER 28, 1998

WELL NUMBER	WATER LEVEL FROM T.O.C. (feet)	FREE-PRODUCT THICKNESS (feet)	WELL DEPTH FROM T.O.C. (feet)	G.S. HEIGHT FROM T.O.C. (feet)	WATER LEVEL FROM G.S. (feet)	T.O.C. ELEV. USGS Datum (Ft. Above MSL)	GROUNDWATER ELEVATIONS USGS Datum (Ft. Above MSL)
KMW-1	12.72	0.00	23.47	0.53	13.25	370.12	357.40
KMW-2	14.08	0.00	23.57	0.43	14.51	370.72	356.64
KMW-3	12.39	0.00	23.46	0.54	12.93	369.10	356.71
KMW-4	13.76	0.00	23.69	0.31	14.07	369.80	356.04
KMW-5	14.17	0.00	23.58	0.42	14.59	369.52	355.35
KMW-6	14.16	0.00	23.47	0.53	14.69	370.08	355.92
KMW-7	12.91	0.00	23.70	0.58	13.49	370.04	357.13
KMW-8	13.37	0.00	23.90	0.58	13.95	368.61	355.24

NOTES:

G.S. = Ground Surface

T.O.C. = Top of casing. All measurements in feet relative to top of casing.

USGS = United States Geological Survey

All wells have 4" ID casing = 0.65 gallons per casing length (foot).

TABLE 2
GROUNDWATER ELEVATION DATA
FRIESMAN RANCH PROPERTY
LIVERMORE, ALAMEDA COUNTY, CALIFORNIA
JANUARY 1999

PERSONNEL: M. MAHONEY

DATE: JANUARY 12, 1999

WELL NUMBER	WATER LEVEL FROM T.O.C. (feet)	FREE-PRODUCT THICKNESS (feet)	WELL DEPTH FROM T.O.C. (feet)	G.S. HEIGHT FROM T.O.C. (feet)	WATER LEVEL FROM G.S. (feet)	T.O.C. ELEV. USGS Datum (Ft. Above MSL)	GROUNDWATER ELEVATIONS USGS Datum (Ft. Above MSL)
KMW-1	12.97	0.00	23.47	0.53	13.50	370.12	357.15
KMW-2	14.32	0.00	23.57	0.43	14.75	370.72	356.40
KMW-3	15.13	0.00	23.46	0.54	15.67	369.10	353.97
KMW-4	14.40	0.00	23.69	0.31	14.71	369.80	355.40
KMW-5	15.32	0.00	23.58	0.42	15.74	369.52	354.20
KMW-6	14.47	0.00	23.47	0.53	15.00	370.08	355.61
KMW-7	13.15	0.00	23.70	0.58	13.73	370.04	356.89
KMW-8	13.70	0.00	23.90	0.58	14.28	368.61	354.91

NOTES:

G.S. = Ground Surface

T.O.C. = Top of casing. All measurements in feet relative to top of casing.

USGS = United States Geological Survey

All wells have 4" ID casing = 0.65 gallons per casing length (foot).

TABLE 3
GROUNDWATER MONITORING WELL SAMPLE ANALYTICAL RESULTS
FRIESMAN RANCH PROPERTY
LIVERMORE, ALAMEDA COUNTY, CALIFORNIA

WELL NUMBER	SAMPLE COLLECTION DATE	TPH-D (µg/L)	TPH-G (µg/L)	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYL BENZENE (µg/L)	TOTAL XYLENES (µg/L)	MTBE (µg/L)	PAHs (µg/L)	LEAD (µg/L)
KMW-1	12/28/98	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	7.8
KMW-2	12/28/98	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	<5
KMW-3	12/28/98	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	<5
KMW-4	12/28/98	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	7.5
KMW-5	12/28/98	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	8.5
KMW-6	12/28/98	1,800 d	3,200 a	86	3.6	140	90	<50**	130*	15
KMW-7	12/28/98	1,000 d,h	9,100 a,h	23	17	190	700	<70**	110*	38
KMW-8	12/28/98	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	12
MCL	12/28/98	--	--	1.0	150	700	1,750	--	--	15***

Notes:

- TPH-D Total Petroleum Hydrocarbons as Diesel
- TPH-G Total Petroleum Hydrocarbons as Gasoline
- MTBE Methyl Tertiary-Butyl Ether
- PAHs Polynuclear Aromatic Hydrocarbons
- MCL Cal/EPA Maximum Contaminant Level
- µg/L Micrograms per Liter (approx. equal to parts per billion)
- <0.5 Not detected at or above the laboratory method reporting limit
- a Unmodified or weakly modified gasoline is significant
- d Gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline ?
- h Lighter than water immiscible sheen is present
- * Naphthalene only, all other chemicals were <20 µg/L
- ** Reporting limit raised due to high presence of TPH-g
- *** Federal MCL

TABLE 4
QUALITY ASSURANCE/QUALITY CONTROL SAMPLE ANALYTICAL RESULTS
FRIESMAN RANCH PROPERTY
LIVERMORE, ALAMEDA COUNTY, CALIFORNIA

QA/QC SAMPLE TYPE	SAMPLE ID	SAMPLE COLLECTION DATE	TPH-D (µg/L)	TPH-G (µg/L)	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYL BENZENE (µg/L)	TOTAL XYLENES (µg/L)	MTBE (µg/L)	PAHs (µg/L)	LEAD (µg/L)
Primary Sample	KMW-1	12/28/98	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	7.8
Duplicate Sample	KMW-11	12/28/98	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	5.9
Trip Blank		12/28/98	-	<50	<0.5	<0.5	<0.5	<0.5	<5.0	-	-
	RPD		NC	NC	NC	NC	NC	NC	NC	NC	27.7%

Notes:

- TPH-D Total Petroleum Hydrocarbons as Diesel
- TPH-G Total Petroleum Hydrocarbons as Gasoline
- MTBE Methyl Tertiary-Butyl Ether
- PAHs Polynuclear Aromatic Hydrocarbons
- RPD Relative Percent Difference
- µg/L Micrograms per Liter (approx. equal to parts per billion)
- <0.5 Not detected at or above the laboratory method reporting limit
- a Unmodified or weakly modified gasoline is significant
- d Gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline ?
- h Lighter than water immiscible sheen is present
- * Naphthalene only, all other chemicals were <20 µg/L
- ** Reporting limit raised due to high presence of TPH-g
- NC Not calculable

APPENDIX A – SOIL BORING/WELL PERMIT DOCUMENTATION



ZONE 7 WATER AGENCY

6997 PARKSIDE DRIVE, PLEASANTON, CALIFORNIA 94588-6127 PHONE (610) 484-2600 X235
FAX (610) 462-3914

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

LOCATION OF PROJECT Friesman Ranch Property
1600 Friesman Rd.
Livermore, CA

PERMIT NUMBER 98208
WELL NUMBER _____
APN 904 0001 001 10

CLIENT
Name Children's Hospital Foundation
Address 747 52nd Street Voice _____
City Oakland Zip 94609

PERMIT CONDITIONS

Circled Permit Requirements Apply

APPLICANT
Name Kleinfelder - NEAL SILER
Fax (925) 484-5838
Address 7133 Koll Center Parkway, Suite 100 Voice (925) 484-1700
City Pleasanton Zip 94566

- (A) GENERAL
 1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
 2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
 3. Permit is void if project not begun within 90 days of approval date.
- B. WATER SUPPLY WELLS
 1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
 2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.
- (C) GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS
 1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
 2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.
- D. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.
- E. CATHODIC. Fill hole above anode zone with concrete placed by tremie.
- F. WELL DESTRUCTION. See attached.
- G. SPECIAL CONDITIONS

TYPE OF PROJECT
Well Construction _____ Geotechnical Investigation _____
Cathodic Protection _____ General _____
Water Supply _____ Contamination _____
Monitoring Well Destruction _____

PROPOSED WATER SUPPLY WELL USE
Domestic _____ Industrial _____ Other _____
Municipal _____ Irrigation _____

DRILLING METHOD:
Mud Rotary _____ Air Rotary _____ Auger 10"
Cable _____ Other _____

DRILLER'S LICENSE NO. _____

WELL PROJECTS
Drill Hole Diameter 10 in. Maximum _____
Casing Diameter 4 in. Depth 25 ft.
Surface Seal Depth 7 ft. Number 2

GEOTECHNICAL PROJECTS
Number of Borings _____ Maximum _____
Hole Diameter _____ in. Depth _____ ft.

ESTIMATED STARTING DATE 12-23-98
ESTIMATED COMPLETION DATE 12-23-98

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

Approved Wyman Hong Date 28 Dec
Wyman Hong

APPLICANT'S SIGNATURE [Signature] Date 12/21/98

**APPENDIX B – SOIL BORING LOGS AND WELL CONSTRUCTION
SUMMARIES**

**ENVIRONMENTAL BORING
AND MONITORING WELL**

Project Friesman Ranch Property		Boring No. KMW-7
Number 10-3006-13/010		
Total Depth 25 feet	Sheet 1 of 2	

Location

Well Location See Site Plan	Section, Range, Township APN 904-0001-001-10 Local Permit # 98208	Owner and Mailing Information Children's Hospital Foundation 747 52 nd Street Oakland, CA 94609-1815
------------------------------------	---	--

Drilling Operations

Drilling Company	Logged By	Task	Start	Finish
Spectrum	Stephen Quayle			
Rig Make/Model CME-75	Driller/Crew Bobby/Mark	Drilling	12-23-98	12-23-98
Bit Type/Diameter Hollow Stem Auger, 10"Ø	Inspector	Completion	12-23-98	12-23-98
Hammer Data 140 pounds, 30 inches	Agency Zone 7 Water Agency	Development	12-23-98	12-23-98

Boring Completion

Monumentation	Well Design	Material and Size	Top	Bottom
Reference Point Description Top of Casing	Surface Casing	Christy box	0 feet	0 feet
Northing	Casing	4"Ø Sched. 40 pvc	0 feet	10 feet
Easting			10 feet	25 feet
Elevation	Screen	4"Ø Sch. 40 pvc, 0.02" pvc - slot	9 feet	25 feet
Reference Point	Filter Pack	2/12 Lonestar	7 feet	9 feet
Datum Mean Sea Level	Bentonite	3/8" pellets	0 feet	7 feet
Surveyed By	Date	Surface Seal	2-5% cement/bentonite grout	

Field Hydrologic Conditions and Observations

Weather			Other Observations		Groundwater			
Temperature	Max.	Min.	Recent Rainfall/Precipitation	Sym.	Date	Time	Level	
			None					
Humidity			Nearby Wells Pumping	▽	12-23-98	0900	23.4 feet	
Windspeed/Direction			Unknown	▽				
calm			Nearby Surface Water	▽	12-23-98	1543	12.91 feet	
Stream, outer edge and through site			Nearby Utilities					
Cloud Cover			Water and storm drains					
Clear								

Surface Conditions
Development Information

Gravel	Total Gallons Purged = 45 gallons (see well development log)
	pH =
	Temperature (°C) =
	Color =
	Conductivity (µmhos/cm) =
	Salinity (0/00) =
	Turbidity (NTUs) =

Additional Remarks

Plate
C-1



LOG OF BORING

Project Friesman Ranch Property		Boring No. KMW-7
Number 10-3006-13/010		
Total Depth 25 feet	Sheet 2 of 2	

Depth (feet)	Sample Number	Sample Type	Blows/Foot	Recovery (%)	OVA (ppm) <input type="checkbox"/> PID <input type="checkbox"/> FID	USCS	Description	Remarks	Well Construction
1							CLAY - dark grayish brown (2.5Y3/2), moist, medium stiff to stiff, moderate to high plasticity, no odor		
2						CI			
3									
4									
5			100					SILTY CLAY - very dark grayish brown (2.5Y3/2), moist, medium stiff to stiff, low to moderate plasticity, no odor	
6			100			CL			
7			100						
8			100						
9			50				CH	12/23/98, 1543	
10			100						
11			100						
12			100						
13			75			CH	same as above except odor		
14			80						
15			100						
16			100						
17			80			CH	FAT CLAY - dark gray (5Y4/1), moist, stiff to very stiff, high plasticity, odor	12/23/98, 0900	
18			90						
19			100						
20			100						
21			30			CH	Boring terminated at 25.0 feet		
22			30						
23			30						
24			30						
25			100						
26									
27									
28									
29									
30									

Designated Purpose(s) of Log
Site Characterization

Logged by S. Quayle	Date 12/23/98	Plate C-1
Drafted by M. Thomas	Date 1/5/98	
Reviewed by N. Siler	Date	

Note: Logs are to be used only for designated purpose(s).

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

**ENVIRONMENTAL BORING
AND MONITORING WELL**

Project Friesman Ranch Property		Boring No. KMW-8
Number 10-3006-13/010		
Total Depth 25 feet	Sheet 1 of 2	

Location

Well Location See Site Plan	Section, Range, Township APN 904-0001-001-10 Local Permit # 98208	Owner and Mailing Information Children's Hospital Foundation 747 52 nd Street Oakland, CA 94609-1815
------------------------------------	---	--

Drilling Operations

Drilling Company	Logged By	Task	Start	Finish
Spectrum	Stephen Quayle			
Rig Make/Model CME-75	Driller/Crew Bobby/Mark	Drilling	12-23-98	12-23-98
Bit Type/Diameter Hollow Stem Auger, 10"Ø	Inspector	Completion	12-23-98	12-23-98
Hammer Data 140 pounds, 30 inches	Agency Zone 7 Water Agency	Development	12-23-98	12-23-98

Boring Completion

Monumentation	Well Design	Material and Size	Top	Bottom
Reference Point Description Top of Casing	Surface Casing	Christy box	0 feet	0 feet
Northing Easting	Casing	4"Ø Sched. 40 pvc	0 feet	10 feet
Elevation	Screen	4"Ø Sch. 40 pvc, 0.02" pvc - slot	10 feet	25 feet
Reference Point Ground	Filter Pack	2/12 Lonestar	9 feet	25 feet
Datum Mean Sea Level	Bentonite	3/8" pellets	7 feet	9 feet
Surveyed By Date	Surface Seal	2-5% cement/bentonite grout	0 feet	7 feet

Field Hydrologic Conditions and Observations

Weather		Other Observations		Groundwater			
Temperature	Max. Min.	Recent Rainfall/Precipitation	Sym.	Date	Time	Level	
		None					
Humidity	--	Nearby Wells Pumping	▽	12-23-98	1200	20 feet	
Windspeed/Direction	calm	Nearby Surface Water	▽	12-23-98	1213	18.95 feet	
Cloud Cover	Clear	Nearby Utilities	▽	12-23-98	1507	13.38 feet	
		Water and storm drains	▽				

Surface Conditions
Development Information

Grass	Total Gallons Purged = 37.5 gallons (see well development log)
	pH =
	Temperature (°C) =
	Color =
	Conductivity (µmhos/cm) =
	Salinity (0/00) =
	Turbidity (NTUs) =

Additional Remarks

Plate

C-2

LOG OF BORING

Project Friesman Ranch Property		Boring No. KMW-8
Number 10-3006-13/010		
Total Depth 25 feet	Sheet 2 of 2	

Depth (feet)	Sample Number	Sample Type	Blows/Foot	Recovery (%)	<input type="checkbox"/> OVA (ppm) <input type="checkbox"/> PID <input type="checkbox"/> FID	USCS	Description	Remarks	Well Construction
1									
2									
3									
4				0		CL	CLAY, silty - very dark gray (10YR3/2), stiff, medium to high plasticity, trace fine sand (~5%), no odor		
5				50					
6				100					
7									
8									
9									
10				95		CL	CLAY, silty - dark grayish brown (140YR4/2), moist, stiff, medium to high plasticity, no odor		
11				100					
12								▼ 12-23-98, 1507	
13									
14									
15				95		CL	CLAY, silty - brown (7.5YR4/2), moist, stiff to very stiff, high plasticity, no odor		
16				100					
17									
18								▼ 12-23-98, 1213	
19								▼ 12-23-98, 1200	
20				100			as above		
21				100					
22				100					
23				100					
24									
25									
26								Boring terminated at 25.0 feet	
27									
28									
29									
30									

Designated Purpose(s) of Log
Site Characterization

Logged by S Quayle	Date 12/21/98	Plate C-2
Drafted by M. Thomas	Date 1/5/98	
Reviewed by N. Siler	Date	

Note: Logs are to be used only for designated purpose(s).

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

January 14, 1999
Job No. 97602-1

Table of Elevations & Coordinates on Monitoring Wells
Friesman Ranch Project
1660 Friesman Road
Pleasanton, California

<u>Well No.</u>	<u>Northing</u>	<u>Easting</u>	<u>Elevation</u>	
KMW7	4138.29	5965.69	370.04	Top north side of PVC casing
			370.62	Top north side of well box
KMW8	4255.38	5732.81	368.61	Top north side of PVC casing
			369.19	Top north side of well box

Basis of Bearings and Coordinates

The bearing South 2°44'51" West taken on the easterly line of that certain 194.988 ± acre parcel of land designated as "Reynold C. Johnson Co." on that certain Record of Survey Number 667 filed for record on March 16, 1984, in Book 12 of Records of Survey at pages 17 & 18 was taken as the basis of bearings for this survey. The northerly terminus of said line (designated as "S 2°44'51" W 1,533.43'" on said survey) was held at coordinate value northing 5000 / Easting 5000.

Benchmark

City of Pleasanton Benchmark #V1257 NGS Benchmark disk stamped V 1257 1974 located 5.05 miles east along Interstate Highway 580 from the junction of Foothill Road at Dublin, 5.65 miles west of Livermore, 0.35 miles east of the junction of El Charro Road, 42 feet south of the south most center line of the east bound highway lanes, 83 feet east of light pole D9382, in the top of the southeast corner of a 3-by-4 foot concrete catch basin with a metal grate, 3.2 feet north of the south right of way fence, 0.3 foot northwest of the southeast corner of the catch basin, and about 2 feet lower in elevation than the east bound lanes.

Elevation = 356.455 M.S.L.

KIER & WRIGHT CIVIL ENGINEERS & SURVEYORS, INC.

5880 WEST LAS POSITAS BOULEVARD, SUITE 34 ♦ PLEASANTON, CALIFORNIA 94588 ♦ (510) 734-8060 ♦ (510) 734-8064

APPENDIX C – FIELD MONITORING NOTES

**RECORD OF WATER LEVEL MEASUREMENTS –
DECEMBER 28, 1998 AND JANUARY 12, 1999**

KA KLEINFELDER

RECORD OF WATER LEVEL MEASUREMENTS

Date: 12/28/98 Weather: Cool & foggy Sheet 1 of 1
 Project: Friesman Ranch Submitted By: Michelle Mahoney Date: 12/29/98
 Project No.: 10-3006-13 Reviewed By: _____ Date: _____

Instrument Number: _____

Well Number	Time (opened/measured) (24-hr)	Sensitivity Setting (est. %)	Measuring Point (M.P.)	Measurement			Replicate Measurements (if requested)			Notes	Included?
				1	2	3	1	2	3		
KMW-2	9:50			14.08							
KMW-7	9:56			12.91							
KMW-6	10:03			14.16							
KMW-3	10:15			12.39							
KMW-4	10:40			13.76							
KMW-5	10:45			14.17							
KMW-8	9:30			13.37							
KMW-1	14:50			12.72							

M.P.: TOC, GS, Cover ring, Other: _____

All Wells Locked - YES / NO

RECORD OF WATER LEVEL MEASUREMENTS

Date: 1/12/98 Weather: clear Sheet 1 of 1
 Project: 10-3006-13 Submitted By: Michelle Wighrey Date: 1/12/98
 Project No.: _____ Reviewed By: _____ Date: _____

Instrument Number: _____

Well Number	Time (24-hr) <small>(opened/measured)</small>	Sensitivity Setting (est. %)	Measuring Point (M.P.)	Measurement			Replicate Measurements (if requested)			Notes	(locked?)
				1	2	3	2	3			
MW-8	13:00			13.70						no oil	
MW-2	13:10			14.32						no oil	
MW-7	13:15			13.15						no oil	
MW-1	13:25			12.97						no oil	
MW-6	13:30			14.47						no oil	
MW-3	13:40			15.13						no oil	
MW-4	13:45			14.40						no oil	
MW-5	13:55			15.32						no oil	

M.P.: TOC, GS, Cover ring, Other: _____ All Wells Locked -- YES / NO

KA KLEINFELDER

WELL NO. KMW-3

WELL DEVELOPMENT & SAMPLING LOG

Date: 12/28/98 Weather: foggy @ 50° Sheet of
 Project: Friesman Ranch Submitted By: Michelle Mahoney Date: 12/29/98
 Project No.: 10-3006-13/011 Reviewed By: Date:

Purpose of Log Development Sampling

Equipment & Decontamination

Purging Equipment	Bailer	Disposable Bailer <u>X3</u>	Suction Pump	Submersible Pump	Dedicated Pump	Other:			
	Bailer	Disposable Bailer	Suction Pump	Submersible Pump	Dedicated Pump	Other:			
Sampling Equipment	Bailer	Disposable Bailer	Suction Pump	Submersible Pump	Dedicated Pump	Other:			
	Bailer	Disposable Bailer	Suction Pump	Submersible Pump	Dedicated Pump	Other:			
Test Equipment	Water Level		pH		Conductivity		Turbidity		
	Meter No.	<u>Solinst 11928</u>	<u>KA 90575</u>		<u>KA 02154</u>		<u>not</u>		
Calibration Date/Time		<u>NA</u>	<u>12/28/98 9:20</u>		<u>12/28/98 9:20</u>		<u>uxd</u>		
Decontamination Methods	Wash		Rinse I		Rinse II		Rinse III		
	DI Tap Other	Steam Hot Cool	DI Tap Other	Steam Hot Cool	DI Tap Other	Steam Hot Cool	DI Tap Other	Steam Hot Cool	
Other:									
Vol. (gal):									
Source:									
Decon. Notes:									

Development / Purge Record

Well Security: good fair poor Well Integrity: good fair poor Locked: yes no

Purge Volume (CV) T.D. - DTW x Factor x 1 CV = 7.3 gal
 Well Diam.: $\square 2" \square 4"$ 23.46 ft - 12.39 ft x 0.175 x 3 = 22 gal
 Free Product?: Odor: no yes Floating Product: none sheen film feet thick

Time (24-hr)	<u>1715</u>	<u>1320</u>	<u>1320</u>	<u>1335</u>				Replicate Goals
Gallons Purged	<u>0</u>	<u>7.3</u>	<u>14.6</u>	<u>21.9</u>				(dev. only)
Surged (minutes)	<u>↑</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>				± 0.10
pH	<u>S</u>	<u>7.42</u>	<u>7.40</u>	<u>7.41</u>				$\pm 1^\circ C$
Temperature (°C)	<u>T</u>	<u>18.5</u>	<u>18.3</u>	<u>18.1</u>				$\pm 10\%$
Cond. ($\mu mhos/cm$)	<u>A</u>	<u>1150</u>	<u>1160</u>	<u>1180</u>				$\pm 10\%$
Salinity (‰)	<u>R</u>	<u>0.9</u>	<u>0.9</u>	<u>0.9</u>				<50 NTUs
Turbidity (NTU's)	<u>T</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>				Colorless
Color	<u>↓</u>	<u>silty brn</u>						$\pm 0.01'$
Depth to Water								
Reference Point:	<u>TOC</u>	<u>Other:</u>						

Sample Log

Sample #	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
<u>KMW-3</u>	<u>1340</u>	<u>3</u>	<u>VOAc</u>	<u>50 ml</u>	<u>Ø</u>	<u>Ø</u>	<u>TPH-g, BTEX, MTBE</u>	<u> </u>
		<u>1</u>	<u>Amber</u>	<u>1L</u>	<u>Ø</u>	<u>Ø</u>	<u>TPH-d</u>	<u> </u>
		<u>1</u>	<u>Amber</u>	<u>1L</u>	<u>Ø</u>	<u>Ø</u>	<u>PAHs</u>	<u> </u>
		<u>1</u>	<u>Poly</u>	<u>500 ml</u>	<u>HNO3</u>	<u>Ø</u>	<u>Total lead</u>	<u> </u>

McCampbell

Misc

Other Observations: 14.56 = 80% recharge recharge rate slow
going to come back to sample.

Final Check: VOAs free of bubbles? yes / no / NA Well Locked? yes no / NA

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. KMW-4

Date: 12/28/98 Weather: foggy @ 50°F Sheet of
 Project: Friesman Beach Submitted By: Michele Mahoney Date: 12/29/98
 Project No.: 10-3000-13/011 Reviewed By: _____ Date: _____

Purpose of Log Development Sampling

Equipment & Decontamination	Purging Equipment	Bailer	Disposable Bailer <u>x 3</u>	Suction Pump	Submersible Pump	Dedicated Pump	Other:		
	Sampling Equipment	Bailer	Disposable Bailer	Suction Pump	Submersible Pump	Dedicated Pump	Other:		
	Test Equipment	Water Level		pH		Conductivity		Turbidity	
	Meter No.	<u>Solinist 1192R</u>		<u>KA 90575</u>		<u>KA 02154</u>		<u>not</u>	
	Calibration Date/Time	<u>NA</u>		<u>12/28/98 9:20</u>		<u>12/28/98 9:20</u>		<u>used</u>	
	Decontamination Methods	Wash		Rinse I		Rinse II		Rinse III	
	TSP	DI	Steam	DI	Steam	DI	Steam	DI	Steam
	Alconox	Tap	Hot	Tap	Hot	Tap	Hot	Tap	Hot
	Other:	Other	Cool	Other	Cool	Other	Cool	Other	Cool
	Vol. (gal):			<u>NA</u>					
Source:									
Decon. Notes:									

Well Security: <u>good</u> fair poor	Well Integrity: good <u>fair</u> poor	Locked: yes <u>no</u>				
Purge Volume (CV) T.D. - DTW <u>x</u> Factor <u>x</u> 1 CV = <u>7</u> gal	Well Diam.: \square 2" \square 4" <u>23.69ft.</u> - <u>13.76ft.</u> <u>x</u> <u>0.175</u> <u>x</u> 3 CV = <u>21</u> gal	feet thick				
Free Product?: Odor: <u>no</u> yes	Floating Product: <u>none</u> sheen	film				
Time (24-hr)	<u>1200</u>	<u>1206</u>	<u>1215</u>	<u>1220</u>	<u>1225</u>	Replicate Goals
Gallons Purged	<u>0</u>	<u>7</u>	<u>14</u>	<u>21</u>	<u>28</u>	(dev. only)
Surged (minutes)	<u>↑</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	± 0.10
pH	<u>S</u>	<u>7.34</u>	<u>7.21</u>	<u>7.18</u>	<u>7.16</u>	$\pm 1^\circ\text{C}$
Temperature (°C)	<u>T</u>	<u>17.9</u>	<u>18.5</u>	<u>18.1</u>	<u>18.1</u>	$\pm 10\%$
Cond. ($\mu\text{mhos/cm}$)	<u>A</u>	<u>1100</u>	<u>1210</u>	<u>1230</u>	<u>1220</u>	$\pm 10\%$
Salinity (%)	<u>R</u>	<u>0.9</u>	<u>0.9</u>	<u>0.9</u>	<u>0.9</u>	< 50 NTUs
Turbidity (NTUs)	<u>T</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	Colorless
Color	<u>↓</u>					$\pm 0.01'$
Depth to Water						
Reference Point:	<u>TOC</u>	Other:				

Sample Log	Sample #	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
		<u>KMW-4</u>	<u>12:35</u>	<u>3</u>	<u>40 ml</u>	<u>VOA</u>	<u>Ø</u>	<u>Ø</u>	<u>TPH-g, BTEX, MTBE</u>
			<u>1</u>	<u>1 L</u>	<u>Amber</u>	<u>Ø</u>	<u>Ø</u>	<u>TPH-d</u>	
			<u>1</u>	<u>1 L</u>	<u>Amber</u>	<u>Ø</u>	<u>Ø</u>	<u>PAHs</u>	
			<u>1</u>	<u>500 ml</u>	<u>Poly</u>	<u>HNO3</u>	<u>Ø</u>	<u>Total lead</u>	

Other Observations: 15.7 = 80% recharge

Final Check: VOAs free of bubbles? yes / no / NA

Well Locked? yes no / NA

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. KMW-5

Date: 12/28/98 Weather: foggy ~ 50°F

Sheet of

Project: Friesman Ranch Submitted By: Michelle N'Anthony

Date: 12/29/98

Project No.: 10-3006-13/011 Reviewed By:

Date:

Purpose of Log Development Sampling

Equipment & Decontamination

Purging Equipment	Bailer	<input checked="" type="checkbox"/> Disposable Bailer x3	Suction Pump	Submersible Pump	Dedicated Pump	Other:		
Sampling Equipment	Bailer	<input checked="" type="checkbox"/> Disposable Bailer	Suction Pump	Submersible Pump	Dedicated Pump	Other:		
Test Equipment	Water Level		pH		Conductivity		Turbidity	
	Meter No.	<u>Solinst 11928</u>	<u>KA 90575</u>		<u>KA 02154</u>		<u>not used</u>	
Calibration Date/Time	<u>NA</u>		<u>12/28/98 9:20</u>		<u>12/28/98 9:20</u>		<u>used</u>	
Decontamination Methods	Wash		Rinse I		Rinse II		Rinse III	
	DI Tap Other	Steam Hot Cool	DI Tap Other	Steam Hot Cool	DI Tap Other	Steam Hot Cool	DI Tap Other	Steam Hot Cool
Other:	<u>NA</u>							
Vol. (gal):	<u> </u>							
Source:	<u> </u>							
Decon. Notes:								

Well Security: (good) fair poor Well Integrity: (good) fair poor Locked: yes (no)

Development / Purge Record

Purge Volume (CV) T.D. - DTW x Factor x 1 C.V. = 6 1228 gal
 Well Diam.: $\square 2" \square 4"$ 23.58 ft. - 14.17 ft. x $\frac{2-0.175}{4-0.663}$ x 3 C.V. = 18 4286 gal
 Free Product?: Odor: (no) yes Floating Product: (none) sheen film feet thick

Time (24-hr)	11:20	11:25	11:30	11:40				Replicate Goals
Gallons Purged	0	6	12	18				(dev. only)
Surged (minutes)	\uparrow	NA	NA	NA				± 0.10
pH	S	7.21	7.20	7.18				$\pm 1^\circ\text{C}$
Temperature ($^\circ\text{C}$)	T	18.6	19.0	19				$\pm 10\%$
Cond. ($\mu\text{mhos/cm}$)	A	1250	1260	1230				$\pm 10\%$
Salinity (%)	R	1.1	1.1	1.1				<50 NTUs
Turbidity (NTU's)	T	NA	NA	NA				Colorless
Color	\downarrow	silty brn.		silty brn.				$\pm 0.01'$
Depth to Water	<u> </u>				14.8			
Reference Point:	TOC	Other:						

Sample Log

Sample #	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
<u>KMW-5</u>	<u>11:40</u>	<u>3</u>	<u>40 ml</u>	<u>VOA</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<u>TPH g, BTEX, MTBE</u>	<u>Mc</u>
		<u>1</u>	<u>1L</u>	<u>Amber</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<u>TPH-d</u>	<u>Camp</u>
		<u>1</u>	<u>1L</u>	<u>Amber</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<u>PAHs</u>	<u>ad</u>
		<u>1</u>	<u>500 ml</u>	<u>Poly</u>	<u>HNO₃</u>	<input checked="" type="checkbox"/>	<u>Total lead</u>	

Misc

Other Observations:

Final Check: VOAs free of bubbles? (yes) / no / NA Well Locked? yes / (no) / NA

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. KMLW-10

Date: 12/28/98

Weather: cool + clear

Sheet of

Project: Friesmar Ranch

Submitted By: Nichole Mahoney

Date: 12/29/98

Project No.: 10-3086-13/011

Reviewed By:

Date:

Purpose of Log Development Sampling

Equipment & Decontamination	Purging Equipment	Bailer	<input checked="" type="checkbox"/> Disposable Bailer	Suction Pump	Submersible Pump	Dedicated Pump	Other:		
	Sampling Equipment	Bailer	<input checked="" type="checkbox"/> Disposable Bailer	Suction Pump	Submersible Pump	Dedicated Pump	Other:		
	Test Equipment	Water Level		pH		Conductivity		Turbidity	
	Meter No.	<u>Solinst 11928</u>		<u>KA 90575</u>		<u>KA 02154</u>		<u>not used</u>	
	Calibration Date/Time	<u>NA</u>		<u>12/28/98 9:20</u>		<u>12/28/98 9:20</u>		<u>used</u>	
	Decontamination Methods	Wash		Rinse I		Rinse II		Rinse III	
	TSP	DI	Steam	DI	Steam	DI	Steam	DI	Steam
	Alconox	Tap	Hot	Tap	Hot	Tap	Hot	Tap	Hot
	Other:	Other	Cool	Other	Cool	Other	Cool	Other	Cool
	Vol. (gal):			<u>NA</u>					
Source:									
Decon. Notes:									

Well Security:	<input checked="" type="checkbox"/> good	<input type="checkbox"/> fair	<input type="checkbox"/> poor	Well Integrity:	<input checked="" type="checkbox"/> good	<input type="checkbox"/> fair	<input type="checkbox"/> poor	Locked:	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>
Purge Volume (CV)	T.D.	-	DTW	x	Factor	x	I.C.V.	=	<u>6.2 gal</u>
Well Diam.: \square 2" \square 4"	<u>23.47ft.</u>	-	<u>14.16ft.</u>	x	$r=0.175$ $r=0.663$	x	<u>3</u>	=	<u>18.6 gal</u>
Free Product?:	Odor: <input checked="" type="checkbox"/> no <input type="checkbox"/> yes	Floating Product:		<input checked="" type="checkbox"/> none	sheen	film			feet thick
Time (24-hr)	<u>16:12</u>	<u>16:16</u>	<u>16:22</u>	<u>16:28</u>					Replicate Goals
Gallons Purged	<u>0</u>	<u>6.2</u>	<u>12.4</u>	<u>18.6</u>					(dev. only)
Surged (minutes)	<u>↑</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>					± 0.10
pH	<u>S</u>	<u>6.73</u>	<u>6.74</u>	<u>6.79</u>					$\pm 1^\circ\text{C}$
Temperature ($^\circ\text{C}$)	<u>T</u>	<u>20</u>	<u>20</u>	<u>20.2</u>					$\pm 10\%$
Cond. ($\mu\text{mhos/cm}$)	<u>A</u>	<u>1400</u>	<u>1600</u>	<u>1530</u>					$\pm 10\%$
Salinity (%)	<u>R</u>	<u>0.9</u>	<u>0.9</u>	<u>0.9</u>					<50 NTUs
Turbidity (NTU's)	<u>T</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>					Colorless
Color	<u>↓</u>								$\pm 0.01'$
Depth to Water				<u>14.55</u>					
Reference Point:	<u>TOC</u>	Other:							

Sample #	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
<u>KMLW-10</u>	<u>16:30</u>	<u>3</u>	<u>40ml</u>	<u>VOAs</u>	\emptyset	\emptyset	<u>TPH-g, RTEK, MTRE</u>	
		<u>1</u>	<u>1L</u>	<u>Amber</u>	\emptyset	\emptyset	<u>TPH-d</u>	
		<u>1</u>	<u>1L</u>	<u>Amber</u>	\emptyset	\emptyset	<u>PAHs</u>	
		<u>1</u>	<u>500ml</u>	<u>Poly</u>	<u>HNO3</u>	\emptyset	<u>Total lead</u>	

McCampbell

Other Observations: <u>Strong odor</u>
Final Check: VOAs free of bubbles? <input checked="" type="checkbox"/> yes / no / NA
Well Locked? yes / <input checked="" type="checkbox"/> no / NA

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. KMW-7

Date: 12/29/98 Weather: cool 45°F

Sheet of

Project: Freisman Ranch Submitted By: Michael Mahoney

Date: 12/29/98

Project No.: 10-30010-13 Reviewed By:

Date:

Purpose of Log Development Sampling

Equipment & Decontamination

Purging Equipment	Bailer	Disposable Bailer <u>X</u>	Suction Pump	Submersible Pump	Dedicated Pump	Other:		
Sampling Equipment	Bailer	Disposable Bailer <u>X</u>	Suction Pump	Submersible Pump	Dedicated Pump	Other:		
Test Equipment	Water Level		pH		Conductivity		Turbidity	
Meter No.	<u>Solinst 11928</u>		<u>KA 90575</u>		<u>KA 02154</u>		<u>not used</u>	
Calibration Date/Time	<u>NA</u>		<u>12/28/98 9:20</u>		<u>12/28/98 9:20</u>		<u>used</u>	
Decontamination Methods	Wash		Rinse I		Rinse II		Rinse III	
DI	Steam	DI	Steam	DI	Steam	DI	Steam	
Tap	Hot	Tap	Hot	Tap	Hot	Tap	Hot	
Other	Cool	Other	Cool	Other	Cool	Other	Cool	
TSP								
Alconox								
Other:								
Vol. (gal):	<u>NA</u>							
Source:								
Decon. Notes:								

Well Security: good fair poor Well Integrity: good fair poor Locked: yes no

Purge Volume (CV) T.D. - DTW x Factor x 1 C.V. = 7.2 gal
 Well Diam.: $\square 2" \square 4"$ 23.7 ft - 12.9 ft x Factor = 0.175 x 3 = 21.6 gal
 Free Product?: Odor: no yes Floating Product: none sheen film feet thick

Development / Purge Record

Time (24-hr)	1700	1710	1720	1725	Replicate Goals
Gallons Purged	0	7.2	14.4	21.6	(dev. only)
Surged (minutes)	<u>↑</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	
pH	<u>7.2</u>	<u>7.18</u>	<u>7.18</u>	<u>7.20</u>	±0.10
Temperature (°C)	<u>T</u>	<u>17.5</u>	<u>17°</u>	<u>17°</u>	±1°C
Cond. (µmhos/cm)	<u>A</u>	<u>1300</u>	<u>1300</u>	<u>1300</u>	±10%
Salinity (%)	<u>R</u>	<u>0.9</u>	<u>0.9</u>	<u>0.9</u>	±10%
Turbidity (NTU's)	<u>T</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<50 NTUs
Color	<u>↓</u>	<u>silty br</u>			Colorless
Depth to Water					±0.01'
Reference Point:	<u>TOC Other:</u>				

Sample Log

Sample #	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
<u>KMW-7</u>	<u>1730</u>	<u>3</u>	<u>40 ml</u>	<u>VOA</u>	<u>Ø</u>	<u>Ø</u>	<u>TPH-d, RTEX, NTRE</u>	<u>McCampbell</u>
		<u>1</u>	<u>1 L</u>	<u>Amber</u>	<u>Ø</u>	<u>Ø</u>	<u>TPH-d</u>	
		<u>1</u>	<u>1 L</u>	<u>Amber</u>	<u>Ø</u>	<u>Ø</u>	<u>PAHs</u>	
		<u>1</u>	<u>500 ml</u>	<u>Poly</u>	<u>HNO3</u>	<u>Ø</u>	<u>Total lead</u>	

Misc

Other Observations:

Final Check: VOAs free of bubbles? yes / no / NA

Well Locked? yes / no / NA

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. KMW-8

Date: 12/28/98 Weather: Overcast ~ 50°F Sheet of

Project: Friedman Ranch Submitted By: Keith Powers / Michele Mahony Date: 12/29/98

Project No.: 10-3006-13/011 Reviewed By: Date:

Purpose of Log Development Sampling

Equipment & Decontamination	Purging Equipment	Bailer <input checked="" type="checkbox"/> Disposable <input checked="" type="checkbox"/> Suction Pump <input checked="" type="checkbox"/> Submersible Pump <input checked="" type="checkbox"/> Dedicated Pump <input type="checkbox"/> Other: <input type="checkbox"/>			
	Sampling Equipment	Bailer <input type="checkbox"/> Disposable Bailer <input checked="" type="checkbox"/> Suction Pump <input type="checkbox"/> Submersible Pump <input type="checkbox"/> Dedicated Pump <input type="checkbox"/> Other: <input type="checkbox"/>			
	Test Equipment	Water Level: <u>Solinst 11928</u> pH: <u>KA 90575</u> Conductivity: <u>KA 02154</u> Turbidity: <u>NOT USED</u>			
	Calibration Date/Time	<u>NA</u> <u>12/28/98/9:20</u> <u>12/28/98/9:20</u> <u>5:20</u>			
Decontamination Methods	Wash	Rinse I	Rinse II	Rinse III	
	DI Tap Other	Steam Hot Cool	DI Tap Other	Steam Hot Cool	
	TSP	Alconox	<u>NA</u>		
	Other:				
Vol. (gal):					
Source:					
Decon. Notes:					

Well Security:	<u>good</u>	fair	poor	Well Integrity:	<u>good</u>	fair	poor	Locked:	yes <input type="checkbox"/>	no <input checked="" type="checkbox"/>
Purge Volume (CV)	T.D. -	DTW	<u>x</u>	Factor	<u>x</u>	I.C.V.	=	<u>7</u>	gal	
Well Diam.: \square 2" \times 4"	<u>23.9</u> ft.		<u>13.37</u> ft.	<u>x</u>	<u>r=0.175</u>	<u>x 3</u>	=	<u>27</u>	gal	
Free Product?:	Odor: <u>no</u> yes	Floating Product:	<u>none</u>	sheen	film				feet thick	
Time (24-hr)	<u>10:18</u>	<u>10:25</u>	<u>10:31</u>	<u>10:38</u>					Replicate Goals	
Gallons Purged	<u>0</u>	<u>7</u>	<u>14</u>	<u>21</u>					(dev. only)	
Surged (minutes)	<u>↑</u>	<u>NA</u>	<u>—</u>	<u>—</u>		<u>stable</u>			<u>±0.10</u>	
pH	<u>S</u>	<u>7.23</u>	<u>7.22</u>	<u>7.21</u>					<u>±1°C</u>	
Temperature (°C)	<u>T</u>	<u>16.9</u>	<u>17.1</u>	<u>17.1</u>					<u>±10%</u>	
Cond. (µmhos/cm)	<u>A</u>	<u>1590</u>	<u>1510</u>	<u>1590</u>					<u>±10%</u>	
Salinity (‰)	<u>R</u>	<u>1.1</u>	<u>1.1</u>	<u>1.1</u>					<u><50 NTUs</u>	
Turbidity (NTU's)	<u>T</u>	<u>Not measured</u>							<u>Colorless</u>	
Color	<u>↓</u>	<u>Silty Brass</u>							<u>±0.01'</u>	
Depth to Water				<u>13.8</u>						
Reference Point:	<u>TOC</u>	Other:								

Sample Log	Sample #	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
		<u>KMW-8</u>	<u>10:45</u>	<u>3</u>	<u>40ml</u>	<u>VQA</u>	<u>None</u>	<u>None</u>	<u>TPH-4/BTEX/MTBE</u>
			<u>1</u>	<u>1L</u>	<u>Amber</u>	<u>—</u>	<u>—</u>	<u>TPH-d</u>	<u>C</u>
			<u>1</u>	<u>1L</u>	<u>Amber</u>	<u>—</u>	<u>—</u>	<u>PAHs</u>	<u>A</u>
			<u>1</u>	<u>500ml</u>	<u>Poly</u>	<u>HNO3</u>	<u>—</u>	<u>Total Lead</u>	<u>M</u>
									<u>P</u>
									<u>BELL</u>

Other Observations:

Final Check: VOAs free of bubbles? (yes) no / NA Well Locked? yes no / NA

**APPENDIX D – CHAIN-OF-CUSTODY RECORDS AND CERTIFIED
ANALYTICAL LABORATORY REPORTS**

PROJECT NO.		PROJECT NAME		NO. OF CONTAINERS	TYPE OF CONTAINERS	ANALYSIS										RECEIVING LAB	
L.P. NO. / P.O. NO.		SAMPLERS: (Signature/Number)				TPH-d - 8015 TPH-g - 8015 BTEX - 8015 MTRE - 8020 PAH's only 8020 Total Lead 8010 A										INSTRUCTIONS/REMARKS	
DATE	SAMPLE I.D. TIME	SAMPLE I.D.	MATRIX														
12/28/98		Trip Blank	water	1	VOA	X	X	X									
	10:45	KMW-8	"	6	VOA Aguer	X	X	X	X	X	X						
	11:40	KMW-5	"	6	"	X	X	X	X	X	X						
	12:35	KMW-4	"	11	"	X	X	X	X	X	X						
	1340	KMW-3	"	11	"	X	X	X	X	X	X						
	1425	KMW-2	"	11	"	X	X	X	X	X	X						
	1530	KMW-1	"	11	"	X	X	X	X	X	X						
	1545	KMW-11	"	11	"	X	X	X	X	X	X						
	1630	KMW-6	"	11	"	X	X	X	X	X	X						
	1730	KMW-7	"	11	"	X	X	X	X	X	X						
		END															

McCampbell
Standard TAT

01064
01065
01066
01067
01068
01069
01070
01071
01072
01073

ICE PRESERVATION
 GOOD CONDITION APPROPRIATE CONTAINERS
 HEAD SPACE ABSENT

Relinquished by: (Signature) <i>Michael Vickrey</i>	Date/Time 12/29/98 10:20	Received by: (Signature) <i>DAVID MORA</i>	Instructions/Remarks:	Send Results To: <i>Neal Siler</i> KLEINFELDER 7133 KOLL CENTER PARKWAY SUITE 100 PLEASANTON, CA 94566 (510) 484-1700 Attn: Fax 925-484-5838
Relinquished by: (Signature) <i>David Mora</i>	Date/Time 12/29/98 10:50	Received by: (Signature) <i>David Mora</i>		
Relinquished by: (Signature)	Date/Time	Received by Laboratory by: (Signature)		



McCAMPBELL ANALYTICAL INC.

110 Second Avenue South, #D7, Pacheco, CA 94553
Telephone : 925-798-1620 Fax : 925-798-1622
<http://www.mccampbell.com> E-mail: main@mccampbell.com

Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #10-3006-13/012; Friesman Ranch	Date Sampled: 12/28/98
		Date Received: 12/29/98
	Client Contact: Neal Siler	Date Extracted: 12/29/98
	Client P.O:	Date Analyzed: 12/29/98

01/06/99

Dear Neal:

Enclosed are:

- 1). the results of 10 samples from your #10-3006-13/012; Friesman Ranch project,
- 2). a QC report for the above samples
- 3). a copy of the chain of custody, and
- 4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Edward Hamilton, Lab Director



McCAMPBELL ANALYTICAL INC.

110 Second Avenue South, #D7, Pacheco, CA 94553
 Telephone : 925-798-1620 Fax : 925-798-1622
<http://www.mccampbell.com> E-mail: main@mccampbell.com

Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #10-3006-13/012; Friesman Ranch	Date Sampled: 12/28/98
	Client Contact: Neal Siler	Date Received: 12/29/98
	Client P.O:	Date Extracted: 12/31-01/01/99
		Date Analyzed: 12/31-01/01/99

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with Methyl tert-Butyl Ether* & BTEX*
 EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g) ⁺	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	% Recovery Surrogate
01064	Trip Blank	W	ND	ND	ND	ND	ND	ND	108
01065	KMW-8	W	ND	ND	ND	ND	ND	ND	109
01066	KMW-5	W	ND	ND	ND	ND	ND	ND	112
01067	KMW-4	W	ND	ND	ND	ND	ND	ND	109
01068	KMW-3	W	ND	ND	ND	ND	ND	ND	111
01069	KMW-2	W	ND	ND	ND	ND	ND	ND	109
01070	KMW-1	W	ND	ND	ND	ND	ND	ND	108
01071	KMW-11	W	ND	ND	ND	ND	ND	ND	111
01072	KMW-6	W	3200,a	ND<50	86	3.6	140	90	105
01073	KMW-7	W	9100,a,h	ND<70	23	17	190	700	112 [#]
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	5.0	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.05	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP and SPLP extracts in ug/L

[#] cluttered chromatogram; sample peak coelutes with surrogate peak

*The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment; j) no recognizable pattern.



McCAMPBELL ANALYTICAL INC.

110 Second Avenue South, #D7, Pacheco, CA 94553
 Telephone : 925-798-1620 Fax : 925-798-1622
<http://www.mccampbell.com> E-mail: main@mccampbell.com

Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #10-3006-13/012; Friesman Ranch	Date Sampled: 12/28/98
	Client Contact: Neal Siler	Date Received: 12/29/98
	Client P.O:	Date Extracted: 12/29/98
		Date Analyzed: 12/31-01/03/99

Diesel Range (C10-C23) Extractable Hydrocarbons as Diesel *

EPA methods modified 8015, and 3550 or 3510; California RWQCB (SF Bay Region) method GCFID(3550) or GCFID(3510)

Lab ID	Client ID	Matrix	TPH(d) ⁺	% Recovery Surrogate
01065	KMW-8	W	ND	105
01066	KMW-5	W	ND	101
01067	KMW-4	W	ND	107
01068	KMW-3	W	ND	104
01069	KMW-2	W	ND	101
01070	KMW-1	W	ND	102
01071	KMW-11	W	ND	108
01072	KMW-6	W	1800,d	105
01073	KMW-7	W	1000,d,h	102
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit	W	50 ug/L		
	S	1.0 mg/kg		

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP / STLC / SPLP extracts in ug/L

* cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

*The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified diesel is significant; b) diesel range compounds are significant; no recognizable pattern; c) aged diesel? is significant; d) gasoline range compounds are significant; e) medium boiling point pattern that does not match diesel (?); f) one to a few isolated peaks present; g) oil range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment.



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Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #10-3006-13/012; Friesman Ranch	Date Sampled: 12/28/98
	Client Contact: Neal Siler	Date Received: 12/29/98
	Client P.O:	Date Extracted: 12/29/98-01/04/99
		Date Analyzed: 01/03/-01/10/99

Polynuclear Aromatic Hydrocarbons (PAH / PNA) by GC-MS
 EPA methods 625 (modified 610) and 3510 or 8270 (modified 8100) and 3550

Lab ID	01065	01066	01067	01068	01069	Reporting Limit		
	Client ID	KMW-8	KMW-5	KMW-4	KMW-3	KMW-2	S	W, STLC TCLP
Matrix	W	W	W	W	W	W		
Compound	Concentration*					mg/kg	ug/L	
Acenaphthene	ND	ND	ND	ND	ND	0.33	10	
Acenaphthylene	ND	ND	ND	ND	ND	0.33	10	
Anthracene	ND	ND	ND	ND	ND	0.33	10	
Benzo(a)anthracene	ND	ND	ND	ND	ND	0.33	10	
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	0.33	10	
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	0.33	10	
Benzo(g,h,i)perylene	ND	ND	ND	ND	ND	0.33	10	
Benzo(a)pyrene	ND	ND	ND	ND	ND	0.33	10	
Chrysene	ND	ND	ND	ND	ND	0.33	10	
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	0.33	10	
Fluoranthene	ND	ND	ND	ND	ND	0.33	10	
Fluorene	ND	ND	ND	ND	ND	0.33	10	
Indeno(1,2,3-cd)pyrene	ND	ND	ND	ND	ND	0.33	10	
Naphthalene	ND	ND	ND	ND	ND	0.33	10	
Phenanthrene	ND	ND	ND	ND	ND	0.33	10	
Pyrene	ND	ND	ND	ND	ND	0.33	10	
% Recovery Surrogate 1	87	115	108	93	112			
% Recovery Surrogate 2	88	118	110	60	75			
Comments								

* water and vapor samples are reported in ug/L, soil and sludge samples in mg/kg, wipes in ug/wipe and all TCLP / STLC / SPLP extracts in ug/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis

* surrogate diluted out of range or surrogate coelutes with another peak

(h) a lighter than water immiscible sheen is present; (i) liquid sample that contains >~5 vol. % sediment; (j) sample diluted due to high organic content.



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Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #10-3006-13/012; Friesman Ranch	Date Sampled: 12/28/98
	Client Contact: Neal Siler	Date Received: 12/29/98
	Client P.O:	Date Extracted: 12/29/98- 01/04/99
		Date Analyzed: 01/03/-01/10/99

Polynuclear Aromatic Hydrocarbons (PAH / PNA) by GC-MS

EPA methods 625 (modified 610) and 3510 or 8270 (modified 8100) and 3550

Lab ID	01070	01071	01072	01073	Reporting Limit		
	Client ID	KMW-1	KMW-11	KMW-6		KMW-7	S
Matrix	W	W	W	W			
Compound	Concentration*				mg/kg	ug/L	
Acenaphthene	ND	ND	ND	ND	0.33	10	
Acenaphthylene	ND	ND	ND	ND	0.33	10	
Anthracene	ND	ND	ND	ND	0.33	10	
Benzo(a)anthracene	ND	ND	ND	ND	0.33	10	
Benzo(b)fluoranthene	ND	ND	ND	ND	0.33	10	
Benzo(k)fluoranthene	ND	ND	ND	ND	0.33	10	
Benzo(g,h,i)perylene	ND	ND	ND	ND	0.33	10	
Benzo(a)pyrene	ND	ND	ND	ND	0.33	10	
Chrysene	ND	ND	ND	ND	0.33	10	
Dibenzo(a,h)anthracene	ND	ND	ND	ND	0.33	10	
Fluoranthene	ND	ND	ND	ND	0.33	10	
Fluorene	ND	ND	ND	ND	0.33	10	
Indeno(1,2,3-cd)pyrene	ND	ND	ND	ND	0.33	10	
Naphthalene	ND	ND	130	110	0.33	10	
Phenanthrene	ND	ND	ND	ND	0.33	10	
Pyrene	ND	ND	ND	ND	0.33	10	
% Recovery Surrogate 1	85	75	103	92			
% Recovery Surrogate 2	65	77	91	80			
Comments							

* water and vapor samples are reported in ug/L, soil and sludge samples in mg/kg, wipes in ug/wipe and all TCLP / STLC / SPLP extracts in ug/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis

* surrogate diluted out of range or surrogate coelutes with another peak

(h) a lighter than water immiscible sheen is present; (i) liquid sample that contains >~5 vol. % sediment; (j) sample diluted due to high organic content.



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Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #10-3006-13/012; Friesman Ranch	Date Sampled: 12/28/98
	Client Contact: Neal Siler	Date Received: 12/29/98
	Client P.O:	Date Extracted: 12/29/98
		Date Analyzed: 12/30/98

Lead*

EPA analytical methods 6010/200.7, 239.2*

Lab ID	Client ID	Matrix	Extraction °	Lead*	% Recovery Surrogate
01065	KMW-8	W	TTLC	0.012	NA
01066	KMW-5	W	TTLC	0.0085	NA
01067	KMW-4	W	TTLC	0.0075	NA
01068	KMW-3	W	TTLC	ND	NA
01069	KMW-2	W	TTLC	ND	NA
01070	KMW-1	W	TTLC	0.0078	NA
01071	KMW-11	W	TTLC	0.0059	NA
01072	KMW-6	W	TTLC	0.015	NA
01073	KMW-7	W	TTLC	0.038	NA
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit	S	TTLC	3.0 mg/kg		
	W	TTLC	0.005 mg/L		
	--	STLC,TCLP	0.2 mg/L		

* soil and sludge samples are reported in mg/kg, wipe samples in ug/wipe, and water samples and all STLC / SPLP / TCLP extracts in mg/L
 *Lead is analysed using EPA method 6010 (ICP)for soils,sludges, STLC & TCLP extracts and method 239.2 (AA Furnace) for water samples
 ° EPA extraction methods 1311(TCLP), 3010/3020(water,TTLC), 3040(organic matrices,TTLC), 3050(solids,TTLC); STLC - CA Title 22
 * surrogate diluted out of range; N/A means surrogate not applicable to this analysis
 * reporting limit raised due matrix interference
 i) liquid sample that contains greater than ~2 vol. % sediment; this sediment is extracted with the liquid, in accordance with EPA methodologies and can significantly effect reported metal concentrations.

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110 2nd Avenue South, #D7, Pacheco, CA 94553

Tele: 925-798-1620 Fax: 925-798-1622

QC REPORT FOR HYDROCARBON ANALYSES

Date: 12/31/98-01/01/99

Matrix: WATER

Analyte	Concentration (mg/L)			Amount Spiked	% Recovery		RPD
	Sample (#00973)	MS	MSD		MS	MSD	
TPH (gas)	0.0	85.7	86.1	100.0	85.7	86.1	0.5
Benzene	0.0	10.7	10.1	10.0	107.0	101.0	5.8
Toluene	0.0	11.1	10.4	10.0	111.0	104.0	6.5
Ethyl Benzene	0.0	11.2	10.9	10.0	112.0	109.0	2.7
Xylenes	0.0	33.6	32.7	30.0	112.0	109.0	2.7
TPH(diesel)	0.0	179	172	150	119	115	3.9
TRPH (oil & grease)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

$$\% \text{ Rec.} = (\text{MS} - \text{Sample}) / \text{amount spiked} \times 100$$

$$\text{RPD} = (\text{MS} - \text{MSD}) / (\text{MS} + \text{MSD}) \times 2 \times 100$$

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Tele: 925-798-1620 Fax: 925-798-1622

QC REPORT FOR SVOCs (EPA 8270/625/525)

Date: 01/03/99-01/04/99

Matrix: WATER

Analyte	Concentration (ug/Kg)			Amount Spiked	% Recovery		RPD
	Sample (#00432)	MS	MSD		MS	MSD	
Phenol	0	59	59	100	59	59	0.0
2-Chlorophenol	0	66	77	100	66	77	15.4
1, 4-Dichlorobenzene	0	86	94	100	86	94	8.9
N-nitroso-di-n-propyl	0	71	75	100	71	75	5.5
1, 2, 4-Trichlorobenz	0	92	98	100	92	98	6.3
4-Chloro-3-methylphen	0	54	55	100	54	55	1.8
4-Nitrophenol	0	52	54	100	52	54	3.8
Acenaphthene	0	74	77	100	74	77	4.0
2, 4- Dinitrotoluene	0	66	69	100	66	69	4.4
Pentachlorophenol	0	32	36	100	32	36	11.8
Pyrene	0	68	73	100	68	73	7.1

$$\% \text{ Rec.} = (\text{MS} - \text{Sample}) / \text{amount spiked} \times 100$$

$$\text{RPD} = (\text{MS} - \text{MSD}) / (\text{MS} + \text{MSD}) \times 2 \times 100$$

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 Tele: 925-798-1620 Fax: 925-798-1622

QC REPORT FOR ICP and/or AA METALS

Date: 12/30/98

Matrix: WATER

Extraction:

TTLIC

Analyte	Concentration (mg/L)			Amount	% Recovery		
	Sample	MS	MSD		MS	MSD	RPD
Total Lead	0.00	4.44	4.33	5.00	89	87	2.5
Total Thallium	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Magnesium	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Nickle	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Zinc	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Copper	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Organic Lead	N/A	N/A	N/A	N/A	N/A	N/A	N/A

$$\% \text{ Rec.} = (\text{MS} - \text{Sample}) / \text{amount spiked} \times 100$$

$$\text{RPD} = (\text{MS} - \text{MSD}) / (\text{MS} + \text{MSD}) \times 2 \times 100$$